numbers in Yorkshire, Derbyshire, and Stafford. Huxley and Wilson have described the same race from horned cairns in Caithness, and from other places of Scotland. I have described them from Wiltshire, Yorkshire, Middlesex, and from Orkney.

There is some doubt of their having been found yet at an early period in Ireland, as Prof. Macalister informs me that he has not recognised them in Ireland, where there are no long barrows. Sir William Wild, on the other hand, recognised Neolithic skulls from Somersetshire as identical with certain ancient Irish skulls. Any skulls from Ireland I have seen, which have shown characters similar to the Neolithic skulls from England, are of later date, but Huxley describes them from chambered tombs, peat mosses, and river deposits of Ireland. I think we may conclude, as regards Ireland, that although it is doubtful whether the Neolithic people were there at as early a date as in Britain, they were certainly there later.

The characters of the skeletons are well marked. The skull is large and well formed, the calvaria is long and proportionally narrow, having a cephalic index of about 70, and of oval shape. The superciliary ridges and glabella are moderately or even feebly developed, the forehead is well formed, narrow, and curves gracefully to the occiput, which is full and rounded. The upper margins of the orbits are thin, and the malar bones are never prominent; the profile of the face is vertical, and there is no tendency to prognathism; the chin is prominent, the symphesial angle is from 70° to 80°; the length of the face from the root of the nose is comparatively short, but as a whole the face is oval in form; the jaws are small and fine, the teeth are of medium size, and generally in a good state of preservation, not much worn down. The last molar is always the smallest tooth of that series. The facial characters are mild, and without exaggerated development in any one direction; the same may be said of the calvaria generally. The age of the persons to whom they belong averages, according to Thurnam, forty-five years, which would seem to indicate that the duration of life was rather short at that time.

The stature of the Neolithic people is short. From Dr. Thurnam's measurements of the femora of twenty-five skeletons, it averages 1·674 m. (5ft. 6½in.) by Rollet's formula; but from my own observations of other specimens which have passed through my hands, I am inclined to consider this as too high an average. In their general characters the bones are slender, often with a well-marked *linea aspera* on the femur and platycnemic tibia, which would show that the Neolithic people led an active life, probably as hunters. Dr. Thurnam has noted that sometimes two or more of the cervical or dorsal vertebræ have a tendency to anchylosis, but I cannot say I have ever seen this.

On the continent of Europe remains of the Neolithic people are found chiefly in caves, and show much the same state of culture and physical features as just described, for instance the well-known Cro-Magnon race; but the sequence of their existence there is not so well defined as in Britain, where they held apparently undisputed possession of the country for a considerable period. Indeed, it is only lately that continental anthropologists have admitted their priority to that of people presenting the character of the next race we will have to deal with.

From the evidence to hand, it seems probable that the Neolithic people occupied the whole of the west of Europe at one time; and I agree with several observers in considering that they are to be identified with the old Iberian race, of which the Basque may be considered a remnant. There is certainly a strong similarity between Basque skulls and those of the Neolithic people of Britain.

Unlike Palæolithic man the Neolithic people have never become extinct in Britain, and their descendants exist to the present time. It is true that subsequent invaders drove them, in many instances, to particular parts of the country, as early history and the excavations of General Pitt-Rivers and others show; but skeletons from ancient tombs indicate that they also mixed with their conquerors.

The next people to appear upon the scene, previous to the dawn of history, are those who were in possession of the greater part of Britain at the time of the Roman invasion. They came into Britain from France and Belgium at a considerably earlier period, and subjugated or displaced the Neolithic race. These are the so-called Celts. Their advent is marked by the introduction of the use of metals into Britain, and they are associated with the Bronze age. From the custom they had of interring their dead, whom they chiefly cremated, in barrows of a circular shape, they are often known as the Round Barrow people. They show a marked advance in civilisation beyond that of Neolithic times, as they were agriculturists, and lived by tilling the soil; they manufactured weapons and ornaments of bronze, and richly decorated pottery; their flint implements also were of better make, as evidenced by their beautiful barbed arrow-heads. To this period belong many of the curious lake dwellings found all over Great Britain and Ireland, Picts houses of Scotland, and bee-hive houses of Ireland.

Their osteological remains show that the skull was large with strongly-developed superciliary ridges and glabella, the brow well formed and broad, the upper occipital region not projecting, the tuberosity being the most prominent. In general form the brain-case is broader and rounder than in the Neolithic race, the cephalic index centring round 81; they were, therefore, a distinctly brachycephalic people. The upper border of the orbit is thick, the malar bones are prominent and large. The jawbones are large, *macrognathous*, and likewise the teeth, which are often much ground down; the profile of the upper jaw is somewhat prominent, which gives a prognathous look to the skull; the chin is well formed. The face as a whole is of an angular lozenge form. The ridges for muscular attachments, both on the cranium and face, are well developed, and the expression is very rugged and savage-like. From the skull Thurnam estimated the average age of the persons interred in the round barrows was fifty-five years, while that of the long barrows was ten years less.

The stature of the Round Barrow race averages 1·747 metres (5 feet 9 inches), which is more than the mean stature of the population of the British Isles at the present day. The limb bones are large, with strongly-developed ridges and depressions for muscular attachments.

This race is everywhere to be found over Great Britain and Ireland, and although conquered by the Romans and subsequent invaders, forms a very important element of the population of the country down to the present day.

[I have to thank Prof. Boyd Dawkins for his kind permission to use woodcuts from his work on "Early Man in Britain," for the purpose of illustrating this publication of my lecture, and to General Pitt-Rivers for permitting the reproduction of a block from his plate in "Excavations near Rushmore," vol. ii. The lecture, as delivered at the Royal Institution, was illustrated by numerous lantern slides, which were not suitable for reproduction.]

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—The Statute relating to Research Degrees has been promulgated, and has given rise to some dissatisfaction among many of those who have hitherto warmly supported the scheme. The supervision of those who wish to qualify for a Research Degree is to be placed, according to the proposed Statute, in the hands of a Delegacy composed of the Vice-Chancellor and Proctors and twelve other members, to be nominated by the Vice-Chancellor and Proctors, the Hebdomadal Council, and the Members of Congregation. This amounts to the creation of a new Delegacy similar in constitution and in powers to the existing Delegacy of non-collegiate students, and it is felt that it is a most unsuitable mode of supervising the work of men none of whom may be less than twenty-one years of age. It was thought that the supervision of the researchers should be vested in the Professorial body, and it is much to be hoped that the proposed Statute will be thrown out in Congregation, for it is nearly certain that no persons qualified for research would submit themselves to the supervision of such a heterogeneous body as the proposed Delegacy, and the scheme, of which so much is expected, would become a dead letter.

In a meeting of the Junior Scientific Club, held on Friday, November 16, Mr. P. Elford, of St. John's, exhibited a specimen of shale oil, and papers were read by Mr. F. Druce, of Magdalen College, on anticyclones and other types of atmospheric pressure, and by Mr. W. W. Fisher, of Corpus Christi College, on the Oxford water supply.

Mr. P. L. Sclater, F.R.S., has been elected an honorary Fellow of Corpus Christi College.

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Cambridge.—Dr. Forsyth, F.R.S., has been appointed Chairman of the Examiners for Part II. of the Mathematical Tripos.

Mr. E. H. Hankin, Fellow of St. John's College, and Professor of Bacteriology at Agra, has been appointed to represent the University at the Indian Medical Congress to be held at Calcutta in December.

The following is the Syndicate appointed to consider a report on the question of special encouragement, by new degrees or otherwise, for post-graduate study and research in the University: The Vice-Chancellor, Dr. Maitland, Dr. D. Macalister, Dr. Jebb, Dr. Forsyth, F.R.S., Prof. Marshall, Prof. Gwatkin, Prof. Foster, F.R.S., Prof. Thomson, F.R.S., Mr. A. W. W. Dale, of Trinity Hall, and Mr. W. Bateson, F.R.S., of St. John's College.

A Grace authorising the Cavendish Laboratory Syndicate to obtain specifications and tenders for the proposed extension of the Laboratory, was offered to the Senate on November 22.

SCIENTIFIC SERIALS

American Journal of Science, November.—On variations and mutations, by W. B. Scott. The author discusses the problem of animal morphology in its various aspects, and the different lines along which a solution has been sought for. These are that of comparative anatomy, embryology, and palæontology, to which, since Bateson's work on the study of variation, a fourth has been joined. The author criticises in detail Bateson's method and its results, and comes to the conclusion that we can no longer assume as a fundamental and self-evident truth that individual variations are the material from which new species are constructed.—Resonance analysis of alternating currents, by M. J. Pupin. This analysis is performed by means of a "resonator circuit" consisting of an inertia coil, a rheostat and a condenser in shunt with an electrostatic voltmeter. The capacity of the condenser is gradually increased from zero upwards. Whenever a capacity has been reached, which with the self-induction of the resonator circuit produces resonance with one of the harmonics in the main circuit, then the resonant rise of potential produces a large deflection in the voltmeter. In this manner all the harmonics which are present in the current of the main circuit can be detected in a few minutes.—On some new methods of obtaining platinochlorides, and on the probable existence of a platinum subchloride, by M. Carey Lea. One of the new methods employs potassium acid sulphite, with a solution of which potassium platinic chloride is moderately heated. The reduction takes about ten to twelve hours, and is known to be complete when the solution has a pure red colour free from yellow. The second method is that with alkaline hypophosphites. If in obtaining potassium platinochloride with the aid of a hypophosphite in excess, the heat is continued after complete conversion to the red salt, the solution in a few minutes changes from red to dark brown. The substance which gives the solution this dark brown colour is very deliquescent, and cannot be crystallised. It cannot be completely separated from the other substances in solution. The author is led by its reactions to suspect that it is a subchloride of platinum, analogous to that of silver.

Journal of Anatomy and Physiology, October. — Dr. Gustav Mann, in a paper entitled "Histological Changes induced in Sympathetic, Motor and Sensory Nerve Cells by Functional Activity (preliminary note)," gives an account of experiments made by him to test the observations of Hodge and F. Vas. Dr. Mann's observations relate to the cervical sympathetic ganglia (which also formed the subject of F. Vas's investigations), the motor area of the cerebrum, and to the retina and optic centres of the brain. His results in part agree with those of Hodge, in part with those of Vas, but they also in other particulars go beyond both. He considers that he has placed beyond doubt, that: (1) During rest, several chromatic materials are stored up in the nerve cell, and that these materials are used up by it during the performance of its function. (2) Activity is accompanied by an increase in size of the cells, the nuclei, and the nucleoli of sympathetic, ordinary motor and sensory ganglionic cells. (3) Fatigue of the nerve cell is accompanied by shrivelling of the nucleus, and probably also of the cell, and by the formation of a diffuse chromatic material in the nucleus.

SOCIETIES AND ACADEMIES

London.

Royal Society, November 15.—"On the Ascent of Sap." By Henry H. Dixon, Assistant to the Professor of Botany, Trinity College, Dublin, and Dr. J. Joly, F.R.S.

Strasburger's experiments have eliminated the direct action of living protoplasm from the problem of the ascent of sap, and have left only the tracheal tissue, as an organised structure, and the transpiration-activity of the leaf wherein to seek an explanation of the phenomenon. The authors investigate the capability of the leaf to transpire against excessive atmospheric pressures. In these experiments the leaf was found able to bring forward its water meniscuses against the highest pressures attained and freely transpire. Whether the draught upon the sap established at the leaf during transpiration be regarded as purely capillary or not, these experiments lead the authors to believe that it alone is quite inadequate to effect the elevation by direct tension of the sap in tall trees. Explanations of the lifting of the sap from other causes prove inadequate.

A reconsideration of the principal experiments of previous observers and some new experiments of the authors lead to the view that the ascent is principally in the lumen and not in the wall.

The explanation of how the tensile stress is transmitted in the ascending sap without rupture of the column of liquid is found in the stable condition of this liquid. The state of stability arises from two circumstances: the internal stability of a liquid when mechanically stretched, whether containing dissolved gases or not, and the additional stability conferred by the minutely subdivided structure of the conducting tissue, which renders the stressed liquid stable even in the presence of free gas.

By direct experiments upon water containing large quantities of dissolved air, the state of internal stability is investigated And, further, by sealing up in the vessels, in which the water to be put under tension is contained, chips of the wood of *Taxus baccata*, the authors find that their presence in no case gives rise to rupture of the stressed liquid, but that this occurs preferably anywhere else, and usually on the glass walls. The establishment of tensile stress is effected in the usual way, by cooling the completely filled vessel. A measurement possessing considerable accuracy afforded 7½ atmospheres as being attained in some of the experiments.

The second condition of stability arises directly from the property of the pit-membranes to oppose the passage of free gas, while they are freely permeable to the motion of a liquid. Hence a chance development of free gas is confined in effect to the minute dimensions of the compartment in which it is evolved, and this one lumen alone is rendered for the time being non-conducting. On the other hand, in the water-filled portion of the tracheal tissue, the closing membranes, occupying the median and least obstructive position, the motion of the stress sap is freely allowed. The structure of the conducting tissue is, in fact, a configuration conferring stability on a stressed liquid in the presence (from various causes) of free gas. As neither free gas nor unwetted dust particles can ascend with the sap, the authors contend that the state of tensile stress necessary to their hypothesis is inevitably induced.

The energy relations of the leaf with its surroundings, on the assumption that evaporation at capillary water-surfaces is mainly responsible for the elevation of sap, may be illustrated by the well-known power of the water-filled porous pot to draw up mercury in a tube to which it is sealed. The authors describe an engine in which the energy entering in the form of heat at the capillary surfaces may be in part utilised to do mechanical work: a battery of twelve small porous pots, freely exposed to the air, keeping up the continuous rotation of a fly-wheel. Replacing the porous pots by a transpiring branch, this too maintains the wheel in rotation. This is, in fact, a vegetable engine. In short, the transpiration effects going on at the leaf are, in so far as they are the result of spontaneous evaporation and uninfluenced by other physiological phenomena, of the "sorting demon" class, in which the evaporating surface plays the part of a sink of thermal energy.

If the tensile stress in the sap is transmitted to the root, the authors suggest that this will establish in the capillaries of the root surface meniscuses competent to condense water rapidly from the surrounding soil. They show by experiment the power possessed even by a root injured by lifting from the soil, of condensing water vapour from a damp atmosphere. Such a state

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